

REMARKS

Claims 19-39 are currently pending in the application. By this amendment, claims 38 and 39 are added for the Examiner's consideration. The new claims do not add new matter to the application and are fully supported by the original disclosure. For example, support for the new claims is provided in the claims as originally filed, at Figure 1, and at pages 3, 4, and 8 of the clean version of the substitute specification filed on September 28, 2007. Reconsideration of the rejected claims in view of the following remarks is respectfully requested.

35 U.S.C. §103 Rejection

Claims 19-23, 25, 28-33, and 36 are rejected under 35 U.S.C. §103(a) for being unpatentable over U.S. Pub. No. 2002/0092766 ("Lampkin '766") in view of U.S. Pat. No. 5,320,729 ("Narizuka"). Claims 24 and 37 are rejected under 35 U.S.C. §103(a) for being unpatentable over Lampkin and Narizuka, and further in view of U.S. Pat. No. 5,338,422 ("Belkind"). Claims 26, 27, and 34 are rejected under 35 U.S.C. §103(a) for being unpatentable over Lampkin and Narizuka, and further in view of U.S. Pat. No. 5,405,517 ("Lampkin '517"). Claim 35 is rejected under 35 U.S.C. §103(a) for being unpatentable over Lampkin and Narizuka, and further in view of U.S. Pat. No. 5,814,195 ("Lehan"). These rejections are respectfully traversed.

To establish a *prima facie* case of obviousness, all claim limitations must be taught or suggested by the prior art. *See, In re Royka*, 490 F.2d 981, 985, 180 USPQ 580, 583 (CCPA 1974); *see also, In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).¹ If the prior art

¹ While the *KSR* court rejected a rigid application of the teaching, suggestion, or motivation ("TSM") test in an obviousness inquiry, the [Supreme] Court acknowledged the importance of identifying "a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does" in an obviousness determination. *Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, 492

reference(s) do not teach or suggest all of the claim limitations, Office personnel must explain why the differences between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art (MPEP 2141). Applicants submit that no proper combination of the applied art teaches or suggests each and every feature of the claimed invention.

Claims 19-23, 25, 28-33, and 36 in view of Lampkin '766 and Narizuka.

The present invention is related to a method and device for magnetron sputtering. More specifically, independent claim 19 recites:

- 19. A magnetron coating system, comprising:
 - a first coating source;
 - an auxiliary substrate arranged between the first coating source and an area into which a substrate to be coated is to be received;
 - a magnetron having a cathode composed of the auxiliary substrate; and
 - a device structured and arranged to determine an area density of the auxiliary substrate.

Also, independent claim 25 recites:

- 25. A method for depositing thin layers, comprising:
 - depositing a layer on an auxiliary substrate via a first coating source;
 - coating a substrate via a magnetron having a cathode composed of the auxiliary substrate; and
 - determining an area density of the auxiliary substrate.

Applicants submit that no proper combination of the applied art teaches or suggests the combination of features recited in the claimed invention. More particularly, Applicants submit that the applied art does not teach or suggest, *inter alia*, a device structured and arranged to determine an area density of the auxiliary substrate, as recited in claim 19, or determining an area density of the auxiliary substrate, as recited in claim 25.

F.3d 1350, 1356-1357 (Fed. Cir. 2007) (quoting *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1731 (2007)).

The Examiner asserts that Lampkin '766 discloses a first coating source at magnetron 14A, an auxiliary substrate at surrogate magnetron 12, and a substrate to be coated at substrate 19 at paragraphs 0047-0053 and 0060. The Examiner acknowledges that Lampkin '766 does not disclose *a device structured and arranged to determine an area density of the auxiliary substrate*, as recited in independent claim 19. The Examiner also admits that Lampkin '766 does not disclose *determining an area density of the auxiliary substrate*, as recited in independent claim 25. However, the Examiner asserts that Narizuka teaches utilizing x-ray fluorescence to determine the makeup of a target at lines 61-62 of col. 2. The Examiner asserts that it would have been obvious to modify Lampkin '766 in view of Narizuka for determining the makeup of a target. Applicants respectfully disagree with the conclusion of obviousness for the following reasons.

Lampkin '766 discloses a source 14A, a surrogate rotating magnetron 12, and a substrate 19 that receives material sputtered from the surrogate magnetron 12 (FIGS. 4A and 6). However, as acknowledged by the Examiner, Lampkin '766 does not disclose determining an area density of the surrogate rotating magnetron 12.

Contrary to the Examiner's assertions, Narizuka does not teach determining the area density of an *auxiliary substrate* arranged between a first coating source and a substrate to be coated. Instead, Narizuka teaches that it is beneficial for a sputtering *target* to have a relative density greater than 95% (col. 2, lines 24-28; col. 5, lines 64-68). Particularly, at lines 61-62 of col. 2, at lines 1-28 of col. 6, and at FIG. 3, Narizuka describes that a sputtering *target* may be analyzed by x-ray fluorometry. However, the sputtering *target* disclosed by Narizuka is different from an *auxiliary substrate* as recited in the claimed invention.

For example, Lampkin refers to a *target* formed in place on the *surrogate*, i.e., what the Examiner identifies as the *auxiliary substrate* (Lampkin paragraph 0005). Thus, there is a difference between a target formed on an auxiliary substrate and the auxiliary substrate itself.

Moreover, in exemplary embodiments of the invention, a layer is deposited onto an auxiliary substrate. Then, the layer deposited on the auxiliary substrate and the material of the auxiliary substrate may serve as a sputtering cathode to form a coating on another substrate. This is described at paragraphs 0013 and 0014 of the clean version of the substitute specification filed on September 28, 2007, reproduced below.

[0013] In implementations, to deposit a layer on a substrate, initially a layer is deposited with known deposit rate by the first coating source onto an auxiliary substrate. This auxiliary substrate now serves as a sputtering cathode for coating the substrate by the magnetron. Of course, not only the layer deposited on the auxiliary substrate can be removed, but also the material of the auxiliary substrate itself. In this case, both materials, optionally together with a component fed in a gaseous form, form the final layer on the substrate.

[0014] In further embodiments, after the determination of the area density of the auxiliary substrate, the area density of the substrate can be determined from the mass balance of the auxiliary substrate. The first coating source may comprise, for example, a planar magnetron, a linear ion source, which sputters a target or implants xenon or krypton, a linear source that is based on the principle of laser ablation, or a linear evaporation source.

Since both the layer deposited on the auxiliary substrate and the material of the auxiliary substrate may contribute to the final layer formed on the substrate, it is beneficial to measure the density of the auxiliary substrate instead of measuring the density of the layer formed on the auxiliary substrate. In this manner, an area density of the coated substrate can be determined from a mass balance of the auxiliary substrate.

In contrast to the claimed invention, neither Lampkin '766 nor Narizuka teaches determining the area density of an auxiliary substrate arranged between a first coating source and a substrate to be coated. Lampkin does not disclose determining the density of anything. At best, Narizuka mentions the density of a target, but makes no mention of determining an area density of an auxiliary substrate upon which such a target is formed. Therefore, the applied art fails to disclose or suggest *a device structured and arranged to determine an area density of the auxiliary substrate*, as recited in claim 19, or *determining an area density of the auxiliary substrate*, as recited in claim 25. Therefore, the applied art does not teach all of the features of the claimed invention, and does not render the claimed invention obvious.

Claims 20-23, 28-33, and 36 depend from independent claims 19 and 25, respectively, and are distinguishable from the applied art at least for the same reasons as the respective base claims. Moreover, the applied art fails to teach all of the features of the dependent claims.

For example, neither Lampkin '766 nor Narizuka teaches *the device comprises a detection device structured and arranged to determine x-ray fluorescence*, as recited in claim 23, or *the determining of the area density of the auxiliary substrate comprises x-ray fluorescence*, as recited in claim 33. Lampkin '766 makes no mention of x-ray fluorescence. Narizuka discloses measured density at various passages (e.g., lines 25-28 of col. 6), and separately discloses x-ray fluorometry in other passages (e.g., lines 13-19 of col. 6); however, Narizuka does not disclose that x-ray fluorometry is used to measure the density. Therefore, Narizuka does not teach *the device comprises a detection device structured and arranged to determine x-ray fluorescence*, as recited in claim 23, or *the determining of the area density of the auxiliary substrate comprises x-ray fluorescence*, as recited in claim 33.

Moreover, Applicants submit that the applied art does not teach *the area density of the auxiliary substrate is determined after the coating of the substrate*, as recited in claim 32. As discussed above with respect to claim 1, Narizuka merely discloses measured density of a sputtering *target*. Narizuka does not disclose determining the density of an *auxiliary substrate*, much less determining the density of an auxiliary substrate *after the coating of another substrate*. Therefore, the applied art does not disclose all of the features of claim 32.

Accordingly, Applicants respectfully request that the §103 rejection of claims 19-23, 25, 28-33, and 36 be withdrawn.

Claims 24 and 37 in view of Lampkin '766, Narizuka, and Belkind.

Claims 24 and 37 depend from independent claims 19 and 25, respectively. Belkind does not cure the deficiencies of Lampkin '766 and Narizuka with respect to the independent claims, nor does the Examiner rely on Belkind for teaching any of the features of the independent claims. Therefore, claims 24 and 37 are distinguishable from the applied art at least for the same reasons as the respective base claims.

Accordingly, Applicants respectfully request that the §103 rejection of claims 24 and 37 be withdrawn.

Claims 26, 27, and 34 in view of Lampkin '766, Narizuka, and Lampkin '517.

Claims 26, 27, and 34 depend from independent claim 25. Lampkin '517 does not cure the deficiencies of Lampkin '766 and Narizuka with respect to the independent claim, nor does the Examiner rely on Lampkin '517 for teaching any of the features of the independent claim. Therefore, claims 26, 27, and 34 are distinguishable from the applied art at least for the same reasons as the base claim. Moreover, the applied art fails to teach all of the features of the dependent claims.

For example, Applicants submit that no proper combination of the applied art teaches *a thickness of the layer deposited on the auxiliary substrate is less than 100 nm*, as recited in claim 26, and *the thickness of the layer deposited on the auxiliary substrate is less than 10 nm*, as recited in claim 27. The Examiner asserts that Lampkin '517 teaches the surface of the auxiliary substrate should be coated at a thickness greater than that removed in a single rotation at col. 5, lines 54-56. Notwithstanding, Applicants submit that this statement does not teach or suggest *a thickness of the layer deposited on the auxiliary substrate is less than 100 nm*, as recited in claim 26, and *the thickness of the layer deposited on the auxiliary substrate is less than 10 nm*, as recited in claim 27. To the contrary, the passage of Lampkin '517 cited by the Examiner makes no mention whatsoever of the particular thicknesses recited in claims 26 and 27. Therefore, the applied art does not disclose or suggest all of the features of claims 26 and 27.

Accordingly, Applicants respectfully request that the §103 rejection of claims 26, 27, and 34 be withdrawn.

Claim 35 in view of Lampkin '766, Narizuka, and Lehan.

Claim 35 depends from independent claim 25. Lehan does not cure the deficiencies of Lampkin '766 and Narizuka with respect to the independent claim, nor does the Examiner rely on Lehan for teaching any of the features of the independent claim. Therefore, claim 35 is distinguishable from the applied art at least for the same reasons as independent claim 25.

Accordingly, Applicants respectfully request that the §103 rejection of claim 35 be withdrawn.

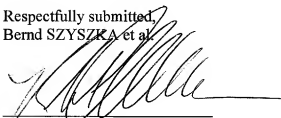
New Claims

New claims 38 and 39 are added by this amendment and are believed to be allowable for the following reasons. Claims 38 and 39 depend from independent claims 19 and 25, respectively, and 34 are distinguishable from the applied art at least for the same reasons as the respective base claims. Moreover, the applied art does not teach or suggest: *determining a deposition rate in a plasma area between the first coating source and the auxiliary substrate, and after the determining the area density of the auxiliary substrate, determining an area density of the substrate from a mass balance of the auxiliary substrate, as recited in claim 38, or the device determines the area density of the auxiliary substrate at a location behind a plasma area between the auxiliary substrate and the substrate to be coated with respect to a direction of rotation of the auxiliary substrate, the location is before a plasma area between the first coating source and the auxiliary substrate with respect to the direction of rotation of the auxiliary substrate, and the device comprises an x-ray source that irradiates the auxiliary substrate at the location and a photodetector that determines x-ray radiation reflected from the auxiliary substrate, as recited in claim 39.*

CONCLUSION

In view of the foregoing remarks, Applicants submit that all of the claims are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue. The Examiner is invited to contact the undersigned at the telephone number listed below, if needed. Applicants hereby make a written conditional petition for extension of time, if required. Please charge any deficiencies in fees and credit any overpayment of fees to Attorney's Deposit Account No. 19-0089.

Respectfully submitted,
Bernd SZYSZKA et al.



Neil F. Greenblum
Reg. No. 28,394

Robert W. Mueller
Reg. No. 35,043

September 22, 2009
GREENBLUM & BERNSTEIN, P.L.C.
1950 Roland Clarke Place
Reston, VA 20191
(703) 716-1191